

3. (Amended) The functionalized zirconium oxide particles of claim 1 wherein said complexed fraction is effective to produce a coagulation point of about 1 minute or more.

4. (Amended) The functionalized zirconium oxide particles of claim 1 wherein said complexed fraction is effective to produce a coagulation point of about 1 hour or more.

5. (Amended) The functionalized zirconium oxide particles of claim 2 wherein said complexed fraction is effective to produce a coagulation point of about 1 minute or more.

6. (Amended) The functionalized zirconium oxide particles of claim 2 wherein said complexed fraction is effective to produce a coagulation point of about 1 hour or more.

7. (Amended) The functionalized zirconium oxide particles of claim 1 wherein said complexed fraction is about 50% or more of said total quantity.

8. (Amended) The functionalized zirconium oxide particles of claim 2 wherein said organofunctional coupling agents are irreversibly complexed with said reactive portion.

9. (Amended) The functionalized zirconium oxide particles of claim 1 wherein said complexed fraction comprises substantially all of said total quantity.

10. (Amended) The functionalized zirconium oxide particles of claim 2 wherein said complexed fraction comprises substantially all of said total quantity.

11. (Amended) The functionalized zirconium oxide particles of claim 3 wherein said complexed fraction comprises substantially all of said total quantity.

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12. (Amended) The functionalized zirconium oxide particles of claim 4 wherein said complexed fraction comprises substantially all of said total quantity.

13. (Amended) The functionalized zirconium oxide particles of claim 5 wherein said complexed fraction comprises substantially all of said total quantity.

14. (Amended) The functionalized zirconium oxide particles of claim 6 wherein said complexed fraction comprises substantially all of said total quantity.

15. (Amended) Functionalized zirconium oxide particles comprising a surface comprising a total quantity of hydroxyl groups comprising a complexed fraction and an uncomplexed fraction, said complexed fraction being effective to produce a coagulation point of about one minute or more after removal of a solvent from a mixture of said ^{Zirconium} metal-oxide particles and a matrix resin.

16. (Amended) The functionalized zirconium oxide particles of claim 15 wherein said complexed fraction is effective to produce a coagulation point of about one hour or more after removal of a solvent.

17. (Amended) The functionalized zirconium oxide particles of claim 15 wherein said complexed portion comprises a less reactive portion complexed with a mobile adhesion promoter and a more reactive portion complexed with an organofunctional coupling agent.

18. (Amended) The functionalized zirconium oxide particles of claim 16 wherein said complexed portion comprises a less reactive portion complexed with a mobile adhesion promoter and a more reactive portion complexed with an organofunctional coupling agent.

19. (Amended) The functionalized zirconium oxide particles of claim 17 wherein the organofunctional coupling agent also comprises an adhesion promoter.

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20. (Amended) The functionalized zirconium oxide particles of claim 18 wherein the organofunctional coupling agent also comprises an adhesion promoter.

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26. (Amended) The functionalized zirconium oxide particles of claim 22 wherein said metal oxide comprises a metal selected from the group consisting of niobium, indium, titanium, zinc, zirconium, tin, cerium, hafnium, tantalum, tungsten, bismuth, and combinations thereof.

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27. (Amended) The functionalized zirconium oxide particles of claim (23) further comprising an alloying element selected from the group consisting of aluminum, phosphorus, gallium, germanium, barium, strontium, yttrium, niobium, antimony, cesium, and combinations thereof.

28. (Amended) The functionalized zirconium oxide particles of claim (24) further comprising an alloying element selected from the group consisting of aluminum, phosphorus, gallium, germanium, barium, strontium, yttrium, niobium, antimony, cesium, and combinations thereof.

29. (Amended) The functionalized zirconium oxide particles of claim (25) further comprising an alloying element selected from the group consisting of aluminum, phosphorus, gallium, germanium, barium, strontium, yttrium, niobium, antimony, cesium, and combinations thereof.

30. (Amended) The functionalized zirconium oxide particles of claim (26) further comprising an alloying element selected from the group consisting of aluminum, phosphorus, gallium, germanium, barium, strontium, yttrium, niobium, antimony, cesium, and combinations thereof.

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31. (Amended) The functionalized zirconium oxide particles of claim 27 further comprising an alloying element selected from the group consisting of aluminum, phosphorus, gallium, germanium, barium, strontium, yttrium, niobium, antimony, cesium, and combinations thereof.

32. (Amended) The functionalized zirconium oxide particles of claim 28 further comprising an alloying element selected from the group consisting of aluminum, phosphorus, gallium, germanium, barium, strontium, yttrium, niobium, antimony, cesium, and combinations thereof.

39. (Amended) The functionalized zirconium oxide particles of claim 1 further comprising a mixture comprising a matrix resin comprising monomers comprising functional groups polymerizable with said organofunctional coupling agents.

40. (Amended) The functionalized zirconium oxide particles of claim 2 further comprising a mixture comprising a matrix resin comprising monomers comprising functional groups polymerizable with said organofunctional coupling agents.

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41. (Amended) The functionalized zirconium oxide particles of claim 5 further comprising a mixture comprising a matrix resin comprising monomers comprising functional groups polymerizable with said organofunctional coupling agents.

42. (Amended) The functionalized zirconium oxide particles of claim 6 further comprising a mixture comprising a matrix resin comprising monomers comprising functional groups polymerizable with said organofunctional coupling agents.

43. (Amended) The functionalized zirconium oxide particles of claim 17 further comprising a mixture comprising a matrix resin comprising monomers comprising functional groups polymerizable with said organofunctional coupling agents.

44. (Amended) The functionalized zirconium oxide particles of claim 18 further comprising a mixture comprising a matrix resin comprising monomers comprising functional groups polymerizable with said organofunctional coupling agents.

45. (Amended) The functionalized zirconium oxide particles of claim 1 comprising an average diameter effective to permit curing of said mixture by photopolymerization.

46. (Amended) The functionalized zirconium oxide particles of claim 2 comprising an average diameter effective to permit curing of said mixture by photopolymerization.

47. (Amended) The functionalized zirconium oxide particles of claim 5 comprising an average diameter effective to permit curing of said mixture by photopolymerization.

48. (Amended) The functionalized zirconium oxide particles of claim 6 comprising an average diameter effective to permit curing of said mixture by photopolymerization.

49. (Amended) The functionalized zirconium oxide particles of claim 17 comprising an average diameter effective to permit curing of said mixture by photopolymerization.

50. (Amended) The functionalized zirconium oxide particles of claim 18 comprising an average diameter effective to permit curing of said mixture by photopolymerization.

51. (Amended) The functionalized zirconium oxide particles of claim 2 wherein a sufficient quantity of said reactive portion is complexed with an organofunctional coupling agent to provide fracture toughness of a cured composite comprising said functionalized metal oxide particles.

52. (Amended) The functionalized zirconium oxide particles of claim 5 wherein a sufficient quantity of said reactive portion is complexed with said organofunctional ^{coupling} agent to provide fracture toughness of a cured composite comprising said functionalized metal oxide particles.

53. (Amended) The functionalized zirconium oxide particles of claim 6 wherein a sufficient quantity of said reactive portion is complexed with said organofunctional ^{coupling} agent to provide fracture toughness of a cured composite comprising said functionalized metal oxide particles.

54. (Amended) The functionalized zirconium oxide particles of claim 17 wherein a sufficient quantity of said reactive portion is complexed with said organofunctional ^{coupling} agent to provide fracture toughness of a cured composite comprising said functionalized metal oxide particles.

55. (Amended) The functionalized zirconium oxide particles of claim 18 wherein a sufficient quantity of said reactive portion is complexed with said organofunctional ^{coupling} agent to

provide fracture toughness of a cured composite comprising said functionalized metal oxide particles.

56. (Amended) The functionalized zirconium oxide particles of claim 2 wherein the organofunctional coupling agent comprises a polymerizable group selected from the group consisting of one or more vinyl groups, acryl groups, epoxy groups, and methacryl groups.

57. (Amended) The functionalized zirconium oxide particles of claim 5 wherein the organofunctional coupling agent comprises a polymerizable group selected from the group consisting of one or more vinyl groups, acryl groups, epoxy groups, and methacryl groups.

58. (Amended) The functionalized zirconium oxide particles of claim 6 wherein the organofunctional coupling agent comprises a polymerizable group selected from the group consisting of one or more vinyl groups, acryl groups, epoxy groups, and methacryl groups.

59. (Amended) The functionalized zirconium oxide particles of claim 17 wherein the organofunctional coupling agent comprises a polymerizable group selected from the group consisting of one or more vinyl groups, acryl groups, epoxy groups, and methacryl groups.

60. (Amended) The functionalized zirconium oxide particles of claim 18 wherein the organofunctional coupling agent comprises a polymerizable group selected from the group consisting of one or more vinyl groups, acryl groups, epoxy groups, and methacryl groups.

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61. (Amended) The functionalized zirconium oxide particles of claim 56 wherein the organofunctional coupling agent comprises a functionality selected from the group consisting of mono-, di-, and tri-functional silanes, isocyanates, zirconates, aluminozirconates, zirconyl methacrylate, titanates, and phosphonates.

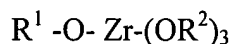
62. (Amended) The functionalized zirconium oxide particles of claim 57 wherein the organofunctional coupling agent comprises a functionality selected from the group consisting of mono-, di-, and tri-functional silanes, isocyanates, zirconates, aluminozirconates, zirconyl methacrylate, titanates, and phosphonates.

63. (Amended) The functionalized zirconium oxide particles of claim 58 wherein the organofunctional coupling agent comprises a functionality selected from the group consisting of mono-, di-, and tri-functional silanes, isocyanates, zirconates, aluminozirconates, zirconyl methacrylate, titanates, and phosphonates.

64. (Amended) The functionalized zirconium oxide particles of claim 59 wherein the organofunctional coupling agent comprises a functionality selected from the group consisting of mono-, di-, and tri-functional silanes, isocyanates, zirconates, aluminozirconates, zirconyl methacrylate, titanates, and phosphonates.

65. (Amended) The functionalized zirconium oxide particles of claim 60 wherein the organofunctional coupling agent comprises a functionality selected from the group consisting of mono-, di-, and tri-functional silanes, isocyanates, zirconates, aluminozirconates, zirconyl methacrylate, titanates, and phosphonates.

66. (Amended) The functionalized zirconium oxide particles of claim 2 wherein the organofunctional groups are hydrolyzable zirconates having the following general structure:

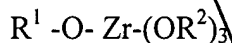


wherein

R^1 is selected from the group consisting of hydrolyzable alkyl groups and hydrolyzable alkenyl groups having 1 or more carbon atoms; and

R^2 is selected from the group consisting of copolymerizable alkenyl substituents containing 2 or more carbon atoms.

67. (Amended) The functionalized zirconium oxide particles of claim 5 wherein the organofunctional groups are hydrolyzable zirconates having the following general structure:

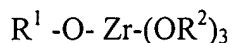


wherein

R^1 is selected from the group consisting of hydrolyzable alkyl groups and hydrolyzable alkenyl groups having 1 or more carbon atoms; and

R^2 is selected from the group consisting of copolymerizable alkenyl substituents containing 2 or more carbon atoms.

68. (Amended) The functionalized zirconium oxide particles of claim 6 wherein the organofunctional groups are hydrolyzable zirconates having the following general structure:

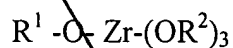


wherein

R¹ is selected from the group consisting of hydrolyzable alkyl groups and hydrolyzable alkenyl groups having 1 or more carbon atoms; and

R² is selected from the group consisting of copolymerizable alkenyl substituents containing 2 or more carbon atoms.

69. (Amended) The functionalized zirconium oxide particles of claim 17 wherein the organofunctional groups are hydrolyzable zirconates having the following general structure:

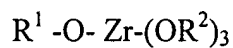


wherein

R¹ is selected from the group consisting of hydrolyzable alkyl groups and hydrolyzable alkenyl groups having 1 or more carbon atoms; and

R² is selected from the group consisting of copolymerizable alkenyl substituents containing 2 or more carbon atoms.

70. (Amended) The functionalized zirconium oxide particles of claim 18 wherein the organofunctional groups are hydrolyzable zirconates having the following general structure:



wherein

R¹ is selected from the group consisting of hydrolyzable alkyl groups and hydrolyzable alkenyl groups having 1 or more carbon atoms; and

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R^2 is selected from the group consisting of copolymerizable alkenyl substituents containing 2 or more carbon atoms.

71. (Amended) The functionalized zirconium oxide particles of claim 66 wherein R^1 is selected from the group consisting of alkyl groups having from about 1 to about 9 carbon atoms.

72. (Amended) The functionalized zirconium oxide particles of claim 67 wherein R^1 is selected from the group consisting of alkyl groups having from about 1 to about 9 carbon atoms.

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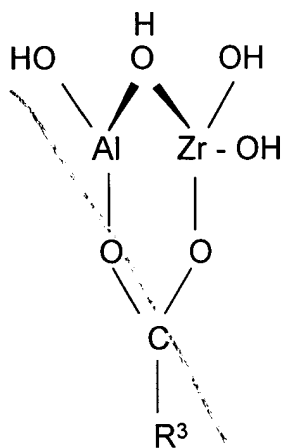
73. (Amended) The functionalized zirconium oxide particles of claim 68 wherein R^1 is selected from the group consisting of alkyl groups having from about 1 to about 9 carbon atoms.

74. (Amended) The functionalized zirconium oxide particles of claim 69 wherein R^1 is selected from the group consisting of alkyl groups having from about 1 to about 9 carbon atoms.

75. (Amended) The functionalized zirconium oxide particles of claim 70 wherein R^1 is selected from the group consisting of alkyl groups having from about 1 to about 9 carbon atoms.

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76. (Amended) The functionalized zirconium oxide particles of claim 2 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates, neopentyl (diallyl) oxy triacryl zirconates, and aluminozirconates having the following general structure:



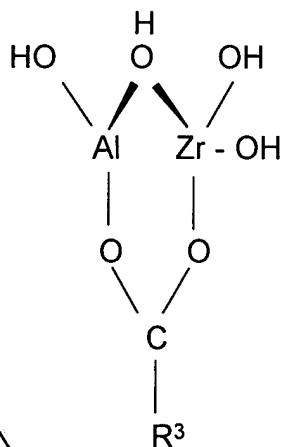
wherein R^3 is selected from the group consisting of copolymerizable alkenyl groups and carboxyfunctional substituents containing 1 or more carbon atoms.

77. (Amended) The functionalized metal oxide particles of claim 5 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates, neopentyl (diallyl) oxy triacryl zirconates, and aluminozirconates having the following general structure: wherein R^3 is selected from the group consisting of copolymerizable alkenyl groups and carboxyfunctional substituents containing 1 or more carbon atoms.

78. (Amended) The functionalized zirconium oxide particles of claims 6 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates, neopentyl (diallyl) oxy triacryl zirconates, and aluminozirconates having the following general structure:

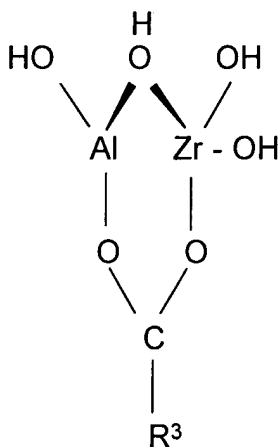
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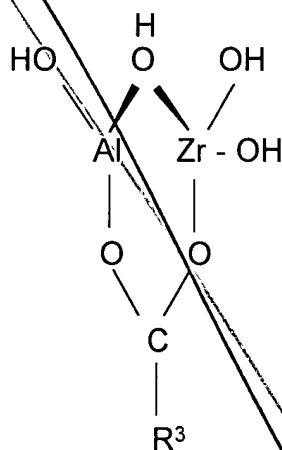
wherein R³ is selected from the group consisting of copolymerizable alkenyl groups and carboxyfunctional substituents containing 1 or more carbon atoms.

79. (Amended) The functionalized zirconium oxide particles of claim 17 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates, neopentyl (diallyl) oxy triacryl zirconates, and aluminozirconates having the following general structure:



wherein R^3 is selected from the group consisting of copolymerizable alkenyl groups and carboxyfunctional substituents containing 1 or more carbon atoms.

80. (Amended) The functionalized zirconium oxide particles of claim 18 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates, neopentyl (diallyl) oxy triacryl zirconates, and aluminozirconates having the following general structure:



wherein R^3 is selected from the group consisting of copolymerizable alkenyl groups and carboxyfunctional substituents containing 1 or more carbon atoms.

81. (Amended) The functionalized zirconium oxide particles of claim 2 wherein said organofunctional groups are methacryloxy aluminozirconates.

82. (Amended) The functionalized zirconium oxide particles of claim 5 wherein said organofunctional groups are methacryloxy aluminozirconates.

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83. (Amended) The functionalized zirconium oxide particles of claim 6 wherein said organofunctional groups are methacryloxy aluminozirconates.

84. (Amended) The functionalized zirconium metal oxide particles of claim 17 wherein said organofunctional groups are methacryloxy aluminozirconates.

85. (Amended) The functionalized zirconium oxide particles of claim 18 wherein said organofunctional groups are methacryloxy aluminozirconates.

86. (Amended) Functionalized zirconium oxide particles comprising:

a surface comprising a total quantity of hydroxyl groups comprising a complexed fraction comprising a reactive portion and a less reactive portion;

said reactive portion being complexed with functionalities selected from the group consisting of functionalities with high steric hindrance, functionalities with low steric hindrance, and a combination thereof;

said less reactive portion being complexed with said groups having a low steric hindrance;

wherein one or more of said functionalities with high steric hindrance and said functionalities with low steric hindrance is bound to the oxide surface via an ester linkage to a phosphonate group.

87. (Amended) The functionalized zirconium oxide particles of claim 2 wherein one or more of said organofunctional coupling agent and said mobile adhesion promoter is bound to the oxide surface via an ester linkage to a phosphonate group.

88. (Amended) The functionalized zirconium oxide particles of claim 5 wherein one or more of said organofunctional coupling agents and said mobile adhesion promoter is bound to the oxide surface via an ester linkage to a phosphonate group.

89. (Amended) The functionalized zirconium oxide particles of claim 6 wherein one or more of said organofunctional coupling agents and said less reactive functionalities is bound to the oxide surface via an ester linkage to a phosphonate group.

90. (Amended) The functionalized zirconium oxide particles of claim 17 wherein one or more of said organofunctional coupling agents and said less reactive functionalities is bound to the oxide surface via an ester linkage to a phosphonate group.

91. (Amended) The functionalized zirconium oxide particles of claim 18 wherein one or more of said organofunctional coupling agents and said less reactive functionalities is bound to the oxide surface via an ester linkage to a phosphonate group.

92. (Amended) The functionalized zirconium oxide particles of claim 86 wherein said phosphonate group comprises a silyl ester which may or may not comprise a polymerizable group.

93. (Amended) The functionalized zirconium oxide particles of claim 87 wherein said phosphonate group comprises a silyl ester which may or may not comprise a polymerizable group.

94. (Amended) The functionalized zirconium oxide particles of claim 88 wherein said phosphonate group comprises a silyl ester which may or may not comprise a polymerizable group.

95. (Amended) The functionalized zirconium oxide particles of claim 89 wherein said phosphonate group comprises a silyl ester which may or may not comprise a polymerizable group.

96. (Amended) The functionalized zirconium oxide particles of claim 90 wherein the phosphonate group comprises a silyl ester which may or may not comprise a polymerizable group.

97. (Amended) The functionalized zirconium oxide particles of claim 91 wherein the phosphonate group comprises a silyl ester which may or may not comprise a polymerizable group.

98. (Amended) The functionalized zirconium oxide particles of claim 1 wherein the functionality with low steric hindrance is selected from the group consisting of silanes, phosphonates, phosphates, chelating agents, fatty acids, fatty alcohols, and ester linked fatty acids.

99. (Amended) The functionalized zirconium oxide particles of claim 2 wherein the mobile adhesion promoter is selected from the group consisting of silanes, phosphonates, phosphates, chelating agents, fatty acids, fatty alcohols, and ester linked fatty acids.

100. (Amended) The functionalized zirconium oxide particles of claim 5 wherein the mobile adhesion promoter is selected from the group consisting of silanes, phosphonates, phosphates, chelating agents, fatty acids, fatty alcohols, and ester linked fatty acids.

101. (Amended) The functionalized zirconium oxide particles of claim 6 wherein the mobile adhesion promoter is selected from the group consisting of silanes, phosphonates, phosphates, chelating agents, fatty acids, fatty alcohols, and ester linked fatty acids.

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102. (Amended) The functionalized zirconium oxide particles of claim 17 wherein the mobile adhesion promoter is selected from the group consisting of silanes, phosphonates, phosphates, chelating agents, fatty acids, fatty alcohols, and ester linked fatty acids.

103. (Amended) The functionalized zirconium oxide particles of claim 18 wherein the mobile adhesion promoter is selected from the group consisting of silanes, phosphonates, phosphates, chelating agents, fatty acids, fatty alcohols, and ester linked fatty acids.

104. (Amended) The functionalized zirconium oxide particles of claim 2 wherein the mobile adhesion promoter comprises dimethyl ethoxy vinyl silane.

105. (Amended) The functionalized zirconium oxide particles of claim 5 wherein the mobile adhesion promoter comprises dimethyl ethoxy vinyl silane.

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106. (Amended) The zirconium oxide particles of claim 6 wherein the mobile adhesion promoter comprises dimethyl ethoxy vinyl silane.

107. (Amended) The zirconium oxide particles of claim 17 wherein the mobile adhesion promoter comprises dimethyl ethoxy vinyl silane.

108. (Amended) The zirconium oxide particles of claim 18 wherein the mobile adhesion promoter comprises dimethyl ethoxy vinyl silane.

109. (Amended) The zirconium oxide particles of claim 1 having an average diameter of from about 10 to about 150 nanometers.

110. (Amended) The zirconium oxide particles of claim 2 having an average diameter of from about 10 to about 150 nanometers.

111. (Amended) The zirconium oxide particles of claim 3 having an average diameter of from about 10 to about 150 nanometers.

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112. (Amended) The zirconium oxide particles of claim 4 having an average diameter of from about 10 to about 150 nanometers.

113. (Amended) A composition comprising the zirconium oxide particles of claim 2 and a matrix comprising at least one monomer comprising a group polymerizable with the organofunctional coupling agent.

114. (Amended) A composition comprising the zirconium oxide particles of claim 5 and a matrix comprising at least one monomer comprising a group polymerizable with the organofunctional coupling agent.

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115. (Amended) A composition comprising the zirconium oxide particles of claim 6 and a matrix comprising at least one monomer comprising a group polymerizable with the organofunctional coupling agent.

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116. (Amended) A composition comprising the zirconium oxide particles of claim 18 and a matrix comprising at least one monomer comprising a group polymerizable with the organofunctional coupling agent.

117. (Amended) A composite comprising the composition of claim 113 wherein said group and said organofunctional coupling agent are copolymerized.

118. (Amended) A composite comprising the composition of claim 114 wherein said group and said organofunctional coupling agent are copolymerized.

119. (Amended) A composite comprising the composition of claim 115 wherein said group and said organofunctional coupling agent are copolymerized.

120. (Amended) A composite comprising the composition of claim 116 wherein said group and said organofunctional coupling agent are copolymerized.

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~~121. (Amended) The composition of claim 113 comprising a dental restorative composition.~~

122. (Amended) The composition of claim 117 comprising a dental restorative composition.

123. (Amended) The composition of claim 113 comprising a prototyping composition.

124. (Amended) The composition of claim 117 comprising a prototyping composition.

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128. (Amended) The functionalized zirconium oxide particles of claim 1 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates and neopentyl (diallyl) oxy triacryl zirconates.

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129. (Amended) The functionalized zirconium oxide particles of claim 2 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates and neopentyl (diallyl) oxy triacryl zirconates.

130. (Amended) The functionalized zirconium oxide particles of claim 66 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethacryl zirconates and neopentyl (diallyl) oxy triacryl zirconates.

131. (Amended) The functionalized zirconium oxide particles of claim 70 wherein the organofunctional groups comprise moieties selected from the group consisting of

neopentyl (diallyl) oxy trimethyacryl zirconates and neopentyl (diallyl) oxy triacryl zirconates.

132. (Amended) The functionalized zirconium oxide particles of claim 71 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethyacryl zirconates and neopentyl (diallyl) oxy triacryl zirconates.

133. (Amended) The functionalized zirconium oxide particles of claim 75 wherein the organofunctional groups comprise moieties selected from the group consisting of neopentyl (diallyl) oxy trimethyacryl zirconates and neopentyl (diallyl) oxy triacryl zirconates.

134. (Amended) The functionalized zirconium oxide particles of claim 3 wherein the mobile adhesion promoter is selected from the group consisting of silanes, phosphonates, phosphates, chelating agents, fatty acids, fatty alcohols, and ester linked fatty acids.

ARGUMENT

1. Restriction requirement

Applicant respectfully requests reconsideration and withdrawal of the restriction requirement.

“Where, as disclosed in the application, the several inventions claimed are related, and such related inventions are not patentably distinct as claimed, restriction under 35 U.S.C. 121 is never proper (MPEP § 806.05).” MPEP 808.02 (emphasis added). The claims of Groups II and III are not patentably distinct from the claims of Group I.

Manufacture, use, or sale of the subject matter of the claims in Groups II and III necessarily would involve manufacture, use, or sale of the subject matter of the claims in Group I.

The argument that applicant previously made--that if the claims in Group I were allowable, then the claims in Group II and III were also allowable--was an attempt to Make this argument, albeit in different words than those used in the MPEP. Applicant respectfully requests reconsideration of the restriction requirement and reinstatement of the claims in Groups II and III.

2. Objections

The examiner issued a number of objections to the specification and claims. The foregoing amendments are believed to overcome the objections. With respect to the objection to claims 25 and 26, Applicant respectfully submits that these claims do not include silicon in the Markush grouping. Claim 21 includes silicon and claim 22 has been amended to include silicon. Claims 25 and 26 further limit claims 21 and 22 by the omission of silicon.

With respect to objection 2c, the examiner queried the fracture toughness of 70% silica-filled resin. The examiner asks "How could a fluctuation factor be more than 50% of the value." As best as Applicant can interpret this query, the examiner is asking how the amount of filler could be varied by 50%. Applicant submits that one of the advantages of the present invention is that similar mechanical properties are obtained using much less of the claimed zirconia filler than would be required using a silica filler.

Rejections Under 35 U.S.C. § 112, first paragraph

Applicant has amended the claims to be limited to zirconium oxides. Applicant traverses the argument that the specification does not provide an adequate definition of “mobile adhesion promoters.” The following definition spans from page 15, line 5 - page 16, line 5 of the specification:

Preferred “mobile adhesion promoters” are defined as surface-active molecules which strongly bind to the surface of the metal oxide cluster, preferably via primary chemical bonding, most preferably irreversibly. In a preferred embodiment, the polar end of the surface-active molecule preferably is bound to the surface by displacing the hydrogen of a hydroxyl group. The hydrophobic tail of the mobile adhesion promoter may intertwine with, but preferably does not chemically react with molecules in the matrix resin. Suitable mobile adhesion promoters include, but are not necessarily limited to silanes, phosphonates, phosphates, chelating agents, such as acetylacetone, fatty acids, such as stearic acid, fatty alcohols, and ester linked fatty acids. Preferred mobile adhesion promoters are silanating agents.

Preferred silanating agents are silanes bearing substituents selected from the group consisting of: from about 1 to about 3 alkyl groups having from about 1 to about 18 carbon atoms; from about 1 to about 3 alkenyl groups; and, from about 1 to about 3 substituents selected from the group consisting of chlorine, bromine, and an alkoxy group having from about 1 to about 4 carbon atoms. Preferred silanating agents have substituents selected from the group consisting of: one alkenyl group; two alkyl groups having from about 1 to about 3 carbon atoms; and, one alkoxy group having from about 1 to about 3 carbon atoms. A most preferred secondary surface agent is dimethyl ethoxy vinyl silane (DMEOVS) (U.S. Patent No. 4,504,231, incorporated herein by reference). DMEOVS has the benefit of increasing the double bond density of the cluster surfaces while also being volatile enough that excessive amounts can be easily removed from the system. Nevertheless, the agent’s greatest value is its ability to displace as many hydroxyl groups from the zirconia surfaces as possible and then to remain in place long enough to allow the particles to be homogeneously dispersed in a highly hydrophobic resin.

The Federal Circuit consistently has held that:

[A] specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented **must be taken as in compliance with the enabling requirement of the first paragraph**

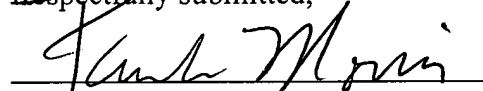
of § 112 unless there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support.

Fiers v. Revel, 25 USPQ 2d 1601, 1607 (Fed. Cir. 1993), citing *In re Marzocchi*, 439 F.2d 220, 223, 169 USPQ 367, 369 (C.C.P.A. 1971) (emphasis added). “How such a teaching is set forth, whether by the use of illustrative examples or by broad descriptive terminology, is of no importance.” *Staehelin v. Secher*, 24 USPQ 2d 1513, 1516 (B.P.A.I. 1992) (emphasis added).

The examiner has not provided technical reason to doubt the objective truth of the quoted statements. Therefore, the claims “must be taken as in compliance with the enabling requirement of the first paragraph of § 112.

The Commissioner is hereby authorized to charge any fees for this response to Deposit Account No. **50-0997(SWRI-2749A)**.

Respectfully submitted,



Paula Morris

Reg. No. 31,516

Paula D. Morris & Associates, P.C.

2925 Briarpark, Suite 930

Houston, Texas 77042

ATTORNEY FOR APPLICANT